REMARKS

The Office Action mailed July 26, 2007 has been carefully reviewed and the following remarks are made in consequence thereof.

Claims 1, 3-15, 17-29 are now pending in this application. Claims 1, 3-15, 17-29 stand rejected. Claims 2, 16, 30, and 31 have been canceled.

The rejection of Claims 1, 2, 5-9, 12-16, 19-23, 28, and 29 under 35 U.S.C. § 103(a) as being unpatentable over Bidaud (U.S. Patent No. 6,347,265) in view of Ford (U.S. Patent No. 6,211,821) and in further view of Gross et al. (U.S. Patent No. 6,218,961) ("Gross") is respectfully traversed.

Bidaud describes a track analyzer coupled to a vehicle (28) traveling on a track (10) that includes a vertical gyroscope (20) for determining a grade and an elevation of the track. A rate gyroscope (50) determines a curvature of the track, and a speed determiner (70) determines a speed of the vehicle relative to the track. A distance determiner (91) determines a distance the vehicle has traveled along the track. The vehicle's heading is found by determining whether the phase of a first plate (112) leads/lags the phase of a second plate (114). Notably, Bidaud does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude.

Ford describes a navigation system (10) that uses satellite positional signals to determine pitch, azimuth and position of a vehicle. The navigation system (10) includes an integration unit (20) that receives a data (15) from a magnetic sensor (30) and data (17) from a heading sensor (40). The magnetic sensor is preferably a magnetic compass. The heading sensor (40) is preferably a single-axis attitude sensor and is used to acquire a positioning signal (13) from a satellite (11), such as a Global Positioning System (GPS) satellite. During periods when the satellite signal (13) is poor or unavailable, the intergation unit (20) continues to provide an azimuth output (19) by using a built in redundancy feature wherein data (17) from the heading sensor (40) is used to correct data (15) from the magnetic sensor and the corrected data is used to ensure the integrity of the azimuth output (19). Notably,

Ford does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, nor determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$.

Gross describes a proximity detection device for preventing collisions between railway vehicles and for providing proximity warnings or brake applications when a collision threat is detected. The device includes a processor (200), a display unit (210), an event recorder (230), and a human/machine interface (220) which can be used to receive inputs from a person controlling the vehicle. In operation, the processor (200) receives location data from vehicles on the railway system and compares that data to the location data for the vehicle on which it is installed (platform vehicle). Such a system could approximate a rail vehicle's location based on a track database (330) to within some range of error. The processor (200) analyzes the vehicle information and generates a warning which activates an alarm on the display unit (210) when a collision threat exists. The human/machine interface (220) allows the operator to acknowledge alarms and control the operation of the proximity detection system. The device determines the geographic location of the vehicle, i.e. the longitude and latitude of the vehicle, and transmits the information to a computer (300). If needed, the computer (300) converts the geographic location from the device (310) to a specific mile post number of the railway system based on information retrieved from the track database (330). For additional accuracy, cross-checking and safety, the computer (300) may also receive inputs of the vehicle's direction of travel and velocity from vehicle sensors (340). Notably, Gross does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, nor determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$.

Claim 1 recites a method for determining motion and location parameters of a railroad locomotive wherein the method includes the steps of "providing at least two satellite signal receivers on the locomotive at spaced locations along the length of the locomotive . . .

determining a vector distance $\vec{\mathbf{d}}$ between the two satellite signal receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determining a set of phase differences between satellite reference signals received by satellite receivers . . . determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$."

None of Bidaud, Ford nor Gross, considered alone or in combination, describes or suggests a method for determining motion and location parameters of a railroad locomotive as is recited in Claim 1. Specifically, none of Bidaud, Ford or Gross, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a system that utilizes multipath error estimates to determine a heading. Furthermore, Ford describes utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the signal from the magnetic sensor and to provide a continuous azimuth output to the integration unit when the positioning signal from the satellite is poor or unavailable. In further contrast, Gross describes a proximity detection device for preventing collisions between railway vehicles and for comparing the location data from vehicles on the railway system wherein the data is found in a track database. Applicants respectfully submit that a description of utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the output signal, does not describe nor suggest determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Accordingly, for at least

the reasons set forth above, Claim 1 is submitted to be patentable over Bidaud in view of Ford and further in view of Gross.

Claim 2 has been canceled. Claims 5-9, and 12-14 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 5-9, and 12-14 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 5-9, and 12-14 likewise are patentable over Bidaud in view of Ford and further in view of Gross.

Claim 15 recites an apparatus for determining motion and location parameters of a railroad locomotive to detect curves and reduce track wear, wherein the apparatus includes "at least two phase-locking satellite receivers configured to reference signals received from a set of satellites . . . a processor configured to . . . determine a set of phase differences between the reference signals received by said satellite receivers . . . determine a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determine an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the reference signals and the vector distance $\vec{\mathbf{d}}$."

None of Bidaud, Ford nor Gross, considered alone or in combination, describes or suggests an apparatus for determining motion and location parameters of a railroad locomotive as is recited in Claim 15. Specifically, none of Bidaud, Ford or Gross, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a system that utilizes multipath error estimates to determine a heading. Furthermore, Ford describes utilizing a heading sensor to make corrections to an output signal from a magnetic

sensor to ensure the integrity of the signal from the magnetic sensor and to provide a continuous azimuth output to the integration unit when the positioning signal from the satellite is poor or unavailable. In further contrast, Gross describes a proximity detection device for preventing collisions between railway vehicles and for comparing the location data from vehicles on the railway system wherein the data is found in a track database. Applicants respectfully submit that a description of utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the output signal, does not describe nor suggest determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Accordingly, for at least the reasons set forth above, Claim 15 is submitted to be patentable over Bidaud in view of Ford and further in view of Gross.

Claim 16 has been canceled. Claims 19-23, 28, and 29 depend, directly or indirectly, from independent Claim 15. When the recitations of Claims 19-23, 28, and 29 are considered in combination with the recitations of Claim 15, Applicants submit that Claims 19-23, 28, and 29 likewise are patentable over Bidaud in view of Ford and further view of Gross.

Moreover, Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. None of Bidaud, Ford or Gross, considered alone or in combination, describes or suggests a method for determining motion and location parameters of a railroad locomotive as is recited in the claims of the present application.

Further, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. It appears that the present rejection reflects an impermissible attempt to use the instant claims as a guide or roadmap in formulating the rejection using impermissible hindsight reconstruction of the invention. The United States Supreme Court has recently expressed concern regarding distortion caused by hindsight bias in an obviousness analysis, and notes that factfinders

should be cautious of arguments reliant upon ex post reasoning. See KSR International Co. v. Teleflex, Inc., slip Opinion at page 17. The Supreme Court also explained that, following "common sense," "familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." Id. at page 16. Applicants respectfully submit that the teachings of Bidaud, Ford and Gross do not fit together like pieces of a puzzle, but rather are isolated disclosures, which have been chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Moreover, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. Applicants respectfully submit that Bidaud, Ford and Gross each teach away from the present application. Specifically, none of Bidaud, Ford nor Gross, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$, as is recited in the claims of the present invention. Accordingly, Applicants respectfully submit that the cited art as a whole teaches away from the present invention. Moreover, Applicants traverse the suggestion in the Office Action at page 4 that it would have been obvious to one of ordinary skill in the art to "use the teaching of Ford in the invention of Bidaud because such a modification would provide a low cost and reliable alternative to a gyrocompass pair." For the reasons stated above, Applicants submit that it would not be obvious to do so.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1, 2, 5-9, 12-16, 19-23, 28, and 29 be withdrawn.

The rejection of Claims 3, 4, 17, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Bidaud in view of Ford as applied to Claims 1, 2, 15, and 16 above, and further in view of Wilson (U.S. Patent No. 6,313,788) is respectfully traversed.

Bidaud and Ford are described above. Wilson describes a method for determining inter-antenna baselines using an antenna configuration (200) that include a pair of relatively closely-spaced (D1) antennas and other pairs of distant (D2) antennas. The closely-spaced pair (D1) provides a short baseline having an integer ambiguity that may be searched exhaustively to identify the correct set of integers. Specifically, as recited at Column 8, lines 40-43, "the exact number of cycles of the radio source carrier wave 310 may be used to reliably resolve the integer ambiguity 380 and thereafter determine the baseline." As such, Wilson describes using radio wave cycles to exhaustively search for and identify integer ambiguities. In contrast, the present invention describes determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude. Notably, Wilson does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, nor determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$.

Claim 1 recites a method for determining motion and location parameters of a railroad locomotive wherein the method includes the steps of "providing at least two satellite signal receivers on the locomotive at spaced locations along the length of the locomotive . . . determining a vector distance $\vec{\mathbf{d}}$ between the two satellite signal receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determining a set of phase differences between satellite reference signals received by satellite receivers . . . determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$."

None of Bidaud, Ford, nor Wilson, considered alone or combination, describes nor suggests a method for determining motion and location parameters of a railroad locomotive, as is recited in Claim 1. Specifically, none of Bidaud, Ford nor Wilson, considered alone or in combination, describes or suggests a method including determining a vector distance

$\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a system that utilizes multipath error estimates to determine a heading. Furthermore, Ford describes utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the signal from the magnetic sensor and to provide a continuous azimuth output to the integration unit when the positioning signal from the satellite is poor or unavailable. In further contrast, Wilson describes using radio wave cycles to exhaustively search for and identify integer ambiguities. Applicants respectfully submit that a description of utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the output signal does not describe nor suggest determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Bidaud in view of Ford and Wilson.

Claims 3 and 4 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 3 and 4 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 3 and 4 likewise are patentable over Bidaud in view of Ford and Wilson.

Claim 15 recites an apparatus for determining motion and location parameters of a railroad locomotive to detect curves and reduce track wear, wherein the apparatus includes "at least two phase-locking satellite receivers configured to reference signals received from a set of satellites . . . a processor configured to . . . determine a set of phase differences between the reference signals received by said satellite receivers . . . determine a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track

grade as a function of latitude and longitude . . . determine an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the reference signals and the vector distance $\vec{\mathbf{d}}$."

None of Bidaud, Ford, nor Wilson, considered alone or combination, describes nor suggests an apparatus for determining motion and location parameters of a railroad locomotive as is recited in Claim 15. Specifically, none of Bidaud, Ford nor Wilson, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a system that utilizes multipath error estimates to determine a heading. Furthermore, Ford describes utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the signal from the magnetic sensor and to provide a continuous azimuth output to the integration unit when the positioning signal from the satellite is poor or unavailable. In further contrast, Wilson describes using radio wave cycles to exhaustively search for and identify integer ambiguities. Applicants respectfully submit that a description of utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the output signal does not describe nor suggest determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Accordingly, for at least the reasons set forth above, Claim 15 is submitted to be patentable over Bidaud in view of Ford and Wilson.

Claims 17 and 18 depend, directly or indirectly, from independent Claim 15. When the recitations of Claims 17 and 18 are considered in combination with the recitations of

Claim 15, Applicants submit that Claims 17 and 18 likewise are patentable over Bidaud in view of Ford and Wilson.

Moreover, Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. None of Bidaud, Ford or Wilson, considered alone or in combination, describes or suggests a method for determining motion and location parameters of a railroad locomotive as is recited in the claims of the present application.

Further, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. It appears that the present rejection reflects an impermissible attempt to use the instant claims as a guide or roadmap in formulating the rejection using impermissible hindsight reconstruction of the invention. The United States Supreme Court has recently expressed concern regarding distortion caused by hindsight bias in an obviousness analysis, and notes that factfinders should be cautious of arguments reliant upon ex post reasoning. See KSR International Co. v. Teleflex, Inc., slip Opinion at page 17. The Supreme Court also explained that, following "common sense," "familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." Id. at page 16. Applicants respectfully submit that the teachings of Bidaud, Ford and Wilson do not fit together like pieces of a puzzle, but rather are isolated disclosures, which have been chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Moreover, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. Applicants respectfully submit that Bidaud, Ford and Wilson each teach

away from the present application. Specifically, none of Bidaud, Ford nor Wilson, neither alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$, as is recited in the present application. Applicants respectfully submit that the cited art as a whole teaches away from the method as recited.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 3, 4, 17, and 18 be withdrawn.

The rejection of Claims 10, 11, and 24-27 under 35 U.S.C. § 103(a) as being unpatentable over Bidaud in view of Ford as applied to Claims 1, 5, 15, and 19 above, and further in view of Kumar (U.S. Patent No. 5,896,947) is respectfully traversed.

Bidaud and Ford are described above. Kumar describes a method for simultaneously lubricating the rail gage side (RAGS) and wheel flanges ahead of a locomotive's (1) tractive wheels, and lubricating the top of the rail (TOR) behind the tractive wheels to reduce the resistance of the trailing cars and to reduce locomotive wheel flange wear. Kumar describes controlling both lubricating units with the same computer controller (2) when a single locomotive (1) is used, and using two controllers (2F, 2R) located in two different locomotives (1) in the case of a train consist (10). Notably, Kumar does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$.

Claim 1 recites a method for determining motion and location parameters of a railroad locomotive, wherein the method includes the steps of "providing at least two satellite signal receivers on the locomotive at spaced locations along the length of the locomotive . . . determining a vector distance $\vec{\mathbf{d}}$ between the two satellite signal receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . .

determining a set of phase differences between satellite reference signals received by satellite receivers . . . determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$."

None of Bidaud, Ford, nor Kumar, considered alone or in combination, describes nor suggests a method for determining at least one of motion and location parameters of a railroad locomotive, as is recited in Claim 1. Specifically, none of Bidaud, Ford nor Kumar, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a system that utilizes multipath error estimates to determine a heading. Furthermore, Ford describes utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the signal from the magnetic sensor and to provide a continuous azimuth output to the integration unit when the positioning signal from the satellite is poor or unavailable. In further contrast, Kumar describes a method for simultaneously lubricating the rail gage side and wheel flanges ahead of a locomotive's tractive wheels, and lubricating the top of the rail behind the tractive wheels to reduce the resistance of the trailing cars and reduce the locomotive wheel flange wear. Applicants respectfully submit that utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the output signal does not describe nor suggest determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Bidaud in view of Ford and Kumar.

Claims 10 and 11 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 10 and 11 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 10 and 11 likewise are patentable over Bidaud in view of Ford and Kumar.

Claim 15 recites an apparatus for determining motion and location parameters of a railroad locomotive to detect curves and reduce track wear, wherein the apparatus includes "at least two phase-locking satellite receivers configured to reference signals received from a set of satellites . . . a processor configured to . . . determine a set of phase differences between the reference signals received by said satellite receivers . . . determine a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determine an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the reference signals and the vector distance $\vec{\mathbf{d}}$."

None of Bidaud, Ford, nor Kumar, considered alone or in combination, describes nor suggests an apparatus for determining motion and location parameters of a railroad locomotive as is recited in Claim 15. Specifically, none of Bidaud, Ford nor Kumar, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a system that utilizes multipath error estimates to determine a heading. Furthermore, Ford describes utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the signal from the magnetic sensor and to provide a continuous azimuth output to the integration unit when the positioning signal from the satellite is poor or

unavailable. In further contrast, Kumar describes a method for simultaneously lubricating the rail gage side and wheel flanges ahead of a locomotive's tractive wheels, and lubricating the top of the rail behind the tractive wheels to reduce the resistance of the trailing cars and reduce the locomotive wheel flange wear. Applicants respectfully submit that utilizing a heading sensor to make corrections to an output signal from a magnetic sensor to ensure the integrity of the output signal does not describe nor suggest determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$. Accordingly, for at least the reasons set forth above, Claim 15 is submitted to be patentable over Bidaud in view of Ford and Kumar.

Claims 24-27 depend, directly or indirectly, from independent Claim 15. When the recitations of Claims 24-27 are considered in combination with the recitations of Claim 15, Applicants submit that Claims 24-27 likewise are patentable over Bidaud in view of Ford and Kumar.

Moreover, Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. None of Bidaud, Ford or Kumar, considered alone or in combination, describes or suggests a method for determining motion and location parameters of a railroad locomotive as is recited in the claims of the present application.

Further, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. It appears that the present rejection reflects an impermissible attempt to use the instant claims as a guide or roadmap in formulating the rejection using impermissible hindsight reconstruction of the invention. The United States Supreme Court has recently expressed concern regarding distortion caused by hindsight bias in an obviousness analysis, and notes that factfinders should be cautious of arguments reliant upon ex post reasoning. See KSR International Co. v. Teleflex, Inc., slip Opinion at page 17. The Supreme Court also explained that, following

"common sense," "familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." Id. at page 16. Applicants respectfully submit that the teachings of Bidaud, Ford and Kumar do not fit together like pieces of a puzzle, but rather are isolated disclosures, which have been chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Moreover, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. Applicants respectfully submit Bidaud, Ford and Kumar each teach away from the method as is recited in the present application. Specifically, none of Bidaud, Ford or Kumar, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers and further determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using *only* the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$, as is recited in the present application. Applicants respectfully submit that the cited art as a whole teaches away from the method as recited.

For at least the reasons set forth above, Applicants respectfully requests that the Section 103 rejection of Claims 10, 11, and 24-27 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,

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